suppose, so thoroughly established that the notable absence of them on these occasions may fairly be taken to suggest a possibility that the phenomena were not truly auroral. If so, their coincidence with the star-shower becomes more noteworthy.

Rugby, January 5 J. B. HASLAM

A SPLENDID shower of meteors occurred on the night of November 27, 1885. Seen from Ava, near Mandalay, at 10 p.m. mean time of place, the point of emergence was near the zenith, and the shower radiated to each point of the horizon. The rate at that hour was 450 to 600 per minute, as near as I could judge lying on my back on the steamer's awning. It is probable, however, that I missed a great many. The point of emergence was at one-fifth the distance from γ Andromedæ (Almach) towards β Andromedæ (Mirach). The following night the shower was still plentiful, but I did not count them. The nights have been very clear and beautiful here.

December 1, 1885 ALFRED CARPENTER

Deposits of the Nile Delta

IN the abstract of the Report of the Committee of the Royal Society, on recent borings in the Nile Delta (NATURE, Dec. 10, 1885, p. 142), there is a reference to my "Notes on the Geology of the Nile Valley" (*Geological Magazine*, 1884), which calls for some explanation in the interests of Egyptian geology. When I saw a portion of the borings in Cairo, in the early part of 1884, the work had extended to a depth of only about 40 feet. At a depth of between 30 and 40 feet the boring-rod, after passing through continuous Nile mud, had entered into quicksand, consisting of polished and rounded grains of quartz and other hard rocks (desert sand), and the difficulties incident to this material had for the time arrested the operations. In connection with this and with the insufficiency of the funds on hand for overcoming the difficulties of the work, I wrote a letter at the time to the President of the Royal Society, strongly urging an additional grant, in order that greater depths might be reached.

I then believed, and still believe, that the quicksand marks the true base of the modern Delta alluvium, and corresponds with the similar sand which in certain parts of the Delta protrudes itself from beneath the fluviatile deposit. I did not, however, suppose that this sand rests directly on the rocky floor of the valley. On the contrary, as might be inferred from my short statement in the *Geological Magazine* (July 1884, p. 292 and footnote), I anticipated that below the sand would be found the Pleistocene clays, marls, sands, and concretionary limestones of the "Isthmian" formation seen at El Guisr on the Suez Canal, and the equivalents of which rise from under the alluvium in several places on the sides of the Nile Valley. These also constitute the lower strata of the borings reported by Figari Bey; and it appeared to me that in the colour and texture of the sediment mixed with the lower samples of the sand there were indications of the approach to these deposits.

Though I have not seen the borings between 40 and 80 feet, I still think that the question whether these are modern, or belong to the Pleistocene, remains to be disposed of, and will require comparison of the lower samples, if they can be separated from the mud and sand introduced from above, with the overlying deposit. This may have already been attended to, but if so, the fact is not stated in the published abstract. With reference to such comparisons I would ask particular attention to the chemical character and depth of the specimens containing calcareous concretions, which are characteristic of the Isthmian rather than of the Nilotic formation.

Of course I do not affirm that the modern deposit of the Delta is in no place thicker than 40 feet, on the contrary, on my view of the history of the district, there must be old buried channels of the Nile in which it is much thicker, but it should be possible to recognise these by the character of the material filling them.

The softness of the Nile water and the minutely arenaceous character of the Nile mud, as well as the connection of this with its fertility, have been remarked from the most ancient times; and the microscopic details given by Prof. Judd have done much to give precision to our views on these points. With respect however to the causes and geological significance of these phenomena, the conclusions stated in the abstract seem open to serious objections, suggested by the physical features of the area drained by the Nile, and the conditions under which the fluviatile deposits are laid down. As this subject is of some importance both with reference to the geology of Egypt and general geology, I would ask your permission to refer to it in a second short communication. J. WILLIAM DAWSON

McGill College, Montreal, December 24, 1885

The Discovery of the Source of the Mississippi

IT is a matter of little importance or interest in what spot is located the ultimate spring of the longest branch of even the greatest river. Especially is this the case with the Mississippi, where it may easily be an open question which of a dozen branches is the longest, when traced through its innumerable lakes and windings. By common consent, however, a certain branch of the Mississippi has been assumed as the river proper, and its head as Lake Itasca, in northern central Minnesota. The river was explored to this point, and the lake discovered in 1832 by Schoolcraft, who published a map of the lake, and of the river from this point downwards. He spent but one night on the lake, and did not explore its tributaries. Four years later Nicollet led an expedition to the head waters of this stream, reached Lake Itasca, and spent several days in making a thorough exploration of the country about it. In his narrative, published in 1841, he gives a full description of the tributaries to the lake which constituted, according to general acceptation, the extreme head waters of the river. The report is accompanied by a map, on which the geographic features described in the narrative are delineated, and which agrees in general with later and more accurate maps.

During the half century which has passed since the time of these explorers, settlement has crowded upon this region, railroads have been built in close proximity to it, and the country has been explored in every direction in the interest of the lumber industry. Furthermore, in 1876, the surveys of the General Land Office were extended over it. Lines were run at intervals of a mile over the whole region, and every lake and pond of any importance was mapped by traverse survey. In short, the country has long since ceased to be a *terra incognita*.

It is therefore with astonishment, not unmixed with a feeling akin to disgust, that we read in the daily papers, in certain magazines, and finally in the *Journal* of the Royal Geographical Society, an account of the alleged "discovery" of the source of the Mississippi, made by a Capt. Glazier, in the summer of 1881. It appears from his narrative, published in great fulness of detail in the *American Meteorological Journal*, September to December, 1884, that his expedition started at St. Paul and pushed its way manfully by rail and stage to the Leech Lake Indian agency. After obtaining at this place a full complement of men and material (except provisions) for a life in the wilderness, they started westward for Lake Itasca. They fortunately escaped all the perils of the journey, and arrived there on the third day safely. Coasting along the shore of the lake, they found a stream coming in at the head of the south-west arm, up which they journeyed, some two hundred yards, when they entered a second lake, which Capt. Glazier claims to be the ultimate source of the Mississippi, and to which, probably in virtue of his heroic achievement in being paddled to it, he claims the right to give his own name. The failure of provisions prevented him from making any further exploration or discovery, and the expedition returned to settlements.

It appears from the explorer's description and from the extremely incorrect map which accompanies his narrative—made, as he naïvely informs the reader, from information furnished by his Indian guide—that his so-called Glazier Lake is identical with a lake in Township 143 north, Range 36 west, which had been carefully mapped by traverse survey by the General Land Office in 1876, or five years prior to his "discovery." This lake, or pond, has an area of about half a square mile. On the Land Office plat it is called Elk Lake, and its connection with Lake Itasca is plainly indicated. By a mere inspection of this plat Capt. Glazier might have made his discovery, and thus have avoided all the hardships and labours of his perilous journey. Since his claim to the discovery of this lake must be considered as altogether baseless, his desire that his name shall be for ever associated with it as the source of the Mississippi River is preposterous, especially as he cannot be ignorant of the above facts. HENRY GANNETT

Washington, D.C.

Chætoderma

YOUR biological readers will probably be interested to learn that I dredged a specimen of *Chætoderma* last August off the

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south end of the Isle of Man from a depth of about 20 fathoms. It is about 1·5 cm. in length, and differs somewhat in shape from both *Chætoderma nitidulum*, Lovén, and the new species (*C. militare*, Selenka) found during the *Challenger* Expedition. The calcareous spicules are also different from those of both the previously described species, but they seem to vary considerably in shape. The specimen—along with the other Vermes obtained during the various dredging expeditions carried on last summer by the members of the Liverpool Marine Biology Committee—has been placed in the hands of Mr. R. J. Harvey Gibson, M.A., for detailed examination, and will be described in the First Report upon the Fauna of Liverpool Bay, to be published shortly. W. A. HERDMAN

University College, Liverpool, December 30, 1885

A Solar Halo

AT about noon on this day a fine halo with its mock suns was well seen at the Radcliffe Observatory. Measurements of the vertical radii of the first circle gave 22° 24′, whilst the angular distance between the true and mock suns was 22° 30′. The radius of the second circle was rather difficult to determine, but the mean of several measures gave 46° 40′. The inverted arcs at the vertices of the two circles were clearly seen. The zenith distance of the sun's centre was nearly 75° at the time of the observation.

E. J. STONE,
Radcliffe Observer

Radcliffe Observatory, Oxford, December 30, 1885

Ventilation

MR. FLETCHER's letter in your issue of December 17 (p. 153) illustrates the difficulties encountered by people who adopt patent ventilators and so-called systems of ventilation without considering the natural laws ruling the flow of currents of air.

The exit-shafts recommended by the writer of your article on the subject, as he himself confesses, may act as inlets, and generally do, if there is no other free inlet for air. This there seldom is in cold weather when the windows are closed, unless a hot-air grate on the Galton or other model is adopted. There is very little objection to running the exit-tube from the chandelier into the chimney flue, on the same principle as that of the chimney to each ventilator, now so much used.

I think the writer of your article hardly appreciates the difficulties to be encountered in ventilating an English house or assembly-room. Irrespective of the ignorance of the public generally on the subject, we are met by the fact that in most town houses it is very difficult to place a stove, with proper fresh-air inlet, in the entrance, where it may afford a supply of fresh warmed air to the house. As a rule the nearest flue is a very long way off. Again, fire-places being as a rule on inside walls in such houses, the flue to supply a hot-air grate (by far the best method of warming) has to be very long, and there is difficulty in arranging for its due cleansing.

Your correspondent speaks of expense being no object in the erection of public buildings. This is far from my experience. In the cases of churches, schools, and assembly-rooms, the question of ventilation is entirely bound up with that of heating, and in conversation with various makers of heating apparatus I have found their views quite unanimous on the peculiarities of building Committees on this subject. The lowest tender is as a rule accepted, and this never provides for ventilation. They are asked to heat only.

The real objection to ventilation in large rooms is the cost of the necessary heating apparatus. For instance, a large concert-room has recently been erected in this neighbourhood to seat 3800 persons, with a cubical content of 514,800 feet.

Now to warm this in the ordinary manner by hot-water pipes would require about 2600 feet of four-inch piping. But to supply a thousand feet of air per head, heated from 30° to 60° Fahr. would, according to the formula given in Hood's work, require no less than 10,600 feet, or more than four times the amount, while the space occupied by more than two miles of large piping would have to be taken into consideration.

No doubt the heating could be done more economically by steam coils or large stoves if care be taken not to over-heat the air.

Until ventilation is considered as necessary as drainage, and is paid for accordingly, and till failure on the part of architect and builder to secure it is visited with as severe penalties as failure in points of construction or design, I see no chance of improvement on the present state of chaos. ERNEST H. JACOB

Leeds, December 22, 1885

Travellers' Snake-Stories

TRAVELLERS' "stories" are not expected to be quite matter-of-fact. One of the best of these jokes occurs in an article on "Travellers' Snake-Stories" in the December number of *Good Words*. Among the natural enemies of snakes the mongoose is thus described:—

"The mongoose, a bird known as the kingfisher of Australia, and secretary-bird of Africa, is well known in some of the West Indian Islands almost always to come off victorious in its encounters with the rattlesnake, and it has even been proposed to breed it specially for its extirpation."

From the use of the singular number in the above extract it is clear that only one animal is intended to be described, and that one is a *bird*. Next follows an interesting description in considerable detail (quoted from the *Standard* of January 22, 1883), of fights between the *Indian* mongoose and the Indian cobra in Lucknow, ending with the sentence:—

"He adds that these birds make affectionate pets," &c.

This is the best joke of all. It may be that the Australian kingfisher and African secretary-bird are locally called "mongoose" (this is not within the present writer's experience), but the *Indian* mongoose is a small animal, in shape very like a weasel or a ferret. It is impossible that the writer in the *Standard* (who is stated to have himself arranged the mongoose and cobra duels) could have described the mongoose as a *bird*. What does the man mean? ALLAN CUNNINGHAM

Blackbird with White Feather

I NOTICE a letter from Mr. Murphy in your issue of December 24, 1885, about a blackbird with a white feather in its tail. Allow me to say that last month I saw a cock blackbird with a pure white tail; the rest of its plumage was natural. I saw it very distinctly, as it was flying away from me at the time, not more than ten yards off when I first noticed it, with its tail extended; I saw it again last week, within a few feet of the same place, this time running under a gate. My wife says she saw a similar bird, at the same spot, about a year ago.

THOMAS J. BUSK

Ford's Grove, Winchmore Hill, January 4

IT may interest your correspondent, Mr. J. J. Murphy, to know that for the last two years we have had a cock blackbird about our garden with a patch of pure white on each side of the head. E. BROWN

Further Barton, Cirencester, January 3

DURING the frost of January 1880 I frequently noticed a hen blackbird with several white feathers on the head, breast, and back. It was quite tame, and came for food every day.

Hartford, Cheshire, December 30, 1885 E. K.

ON THE METHOD OF RECIPROCANTS AS CONTAINING AN EXHAUSTIVE THEORY OF THE SINGULARITIES OF CURVES[1]

IT is now two years and seven days since a message by the Atlantic cable containing the single word "elected" reached me in Baltimore informing me that I had been appointed Savilian Professor of Geometry in Oxford, so that for three weeks I was in the unique position of filling the post and drawing the pay of Professor of Mathematics in each of two Universities: one, the oldest and most renowned, the other—an infant Hercules—the most active and prolific in the world, and which realises what only existed as a dream in the mind of Bacon—the House of Solomon in the New Atlantis.

To Johns Hopkins, who endowed the latter, and in conjunction with it a great Hospital and Medical School, between which he divided a vast fortune accumulated

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[1] Inaugural Lecture of Prof. Sylvester, F.R.S., delivered before the University of Oxford, December 12, 1885.

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